CLAIMS

1. An optical multi-branch communication system comprising:

a parent device having a redundant construction;

a plurality of daughter devices, each having a redundant construction;

a current-system optical network that connects said parent device and said daughter devices;

a preliminary system optical network that connects said parent device and said daughter devices;

a delay controlling unit which controls delay on each of said current-system optical network and said preliminary system optical network; and

a selection switching control unit which selectively switches to an appropriate one of said current-system optical network and said preliminary system optical network based on the result of the delay control carried out by said delay control unit.

2. The redundant optical multi-branch communication system according to claim 1, wherein if at least one of said daughter devices fails, said selection switching control unit carries out a control operation so that said plurality of daughter devices are selectively switched to another optical network that has no failure.

3. The redundant optical multi-branch communication system according to claim 1, wherein based upon the result of the delay control of said delay control unit, said selection switching control unit selectively switches to an appropriate one of said current-system optical network and said preliminary system optical network for each of said daughter devices separately.

4. The redundant optical multi-branch communication system according to claim 3, wherein based upon the result of delay control by the delay control unit, an optical network to which selection switching is made by the selection switching control unit is determined.

5. The redundant optical multi-branch communication system according to claim 3, wherein said selection switching control unit in said parent device preliminarily determines to which one of said current-system optical network and said preliminary system optical network each one of said daughter devices is to be switched, and said parent device sends information to each one of said daughter devices of the network about to which said daughter device will be switched, and each one of said daughter devices determines the network to which said daughter device is to be switched by said selection switching control unit based on the information

received from said parent device.

6. The redundant optical multi-branch communication system according to claim 3, wherein said parent device comprises:

a plurality of buffers which temporarily store information input through said current-system optical network or said preliminary system optical network;

a table which stores first identifying information of each of said daughter devices that has been preliminarily set and second identifying information that is information sent from each of said daughter devices in association with each other; and

a selective reading control unit which identifies a transmission end of information input from said current-system optical network and said preliminary system optical network by reference to the corresponding relationship on said table and for controlling a reading operation from said buffer corresponding to the transmission end.

7. The redundant optical multi-branch communication system according to claim 6, wherein based upon the result of delay control of the delay control unit, each of said daughter devices determines an optical network to which

switching is made by said selection switching control unit based upon the result of delay control of the delay control unit.

8. The redundant optical multi-branch communication system according to claim 6, wherein said selection switching control unit in said parent device preliminarily determines to which one of said current-system optical network and said preliminary system optical network each one of said daughter devices is to be switched, and said parent device sends information to each one of said daughter devices of the network about to which said daughter device will be switched, and each one of said daughter devices determines the network to which said daughter device is to be switched by said selection switching control unit based on the information received from said parent device.

9. The redundant optical multi-branch communication system according to claim 1, further comprising:

a delay difference calculation unit which calculates a delay difference between said current-system optical network and said preliminary system optical network, and creates delay difference information relating to said current-system optical network and said preliminary system optical network based on the delay difference,

wherein said selection switching control unit delays information from the optical network of which the delay difference is small.

10. The redundant optical multi-branch communication system according to claim 9, wherein said selection switching control unit forcefully selects one of said current-system optical network and said preliminary system optical network when a trigger signal is received from outside.

11. The redundant optical multi-branch communication system according to claim 1, wherein some of said daughter devices have a non-redundant construction.

12. A redundant optical multi-branch communication system in which a parent device having a redundant construction and a plurality of daughter devices, each having a redundant construction, are connected to each other through a current-system optical network and a preliminary system optical network and a virtual path having a redundant construction is set so as to connect said parent device and said daughter devices, said redundant optical multi-branch communication system comprising:

a quality monitoring unit which monitors quality on said virtual path basis; and

a selection switching control unit which switches to an appropriate virtual path based upon the quality on the virtual path monitored by said quality monitoring unit.

13. The redundant optical multi-branch communication system according to claim 12, further comprising:

a delay control unit which controls each of the delay amounts on said current-system optical network and said preliminary system optical network,

wherein said selection switching control unit carries out a switching control on a virtual path basis if the result of delay control of said delay control unit is within a predetermined delay amount.

14. The redundant optical multi-branch communication system according to claim 12, further comprising:

a delay difference calculation unit which calculates a delay difference between said current-system optical network and said preliminary system optical network, and creates delay difference information relating to said current-system optical network and said preliminary system optical network based on the delay difference,

wherein said selection switching control unit delays information from the optical network of which the delay difference is small.

15. The redundant optical multi-branch communication system according to claim 14, wherein said selection switching control unit forcefully selects one of said current-system optical network and said preliminary system optical network when a trigger signal is received from outside.

16. The redundant optical multi-branch communication system according to claim 12, wherein some of said daughter devices have a non-redundant construction.